Title Page

Rural Math Excel Partnership (RMEP) Project
Final Performance Report

Selected Sections Submitted to U.S. Department of Education

Investing in Innovation (i3) Office

Folake Reed, Project Officer

Project Award No. U411C120091

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Date: March 29, 2018

U.S. Department of Education
Grant Performance Report Cover Sheet (ED 524B)

Check only one box per Program Office instructions.

[ ] **Annual Performance Report** [**X**] **Final Performance Report**

General Information

1. PR/Award #: **U411C120091** 2. Grantee NCES ID#: **NA**
3. Project Title: **The Rural Math Excel Partnership (RMEP) Project**
4. Grantee Name: **VIRGINIA ADVANCED STUDY STRATEGIES, INC.**
5. Grantee Address: Street: **324 FACTORY ST.** City: **SOUTH BOSTON** State: **VA** Zip: **24592** Zip+4: **3827**
6. Project Director: First Name: **Hobart** Last Name: **Harmon** Title: **RMEP Project Director**
Phone #: **4345750692** Fax #: **4348290034** Email Address: **hharmon@shentel.net**

Reporting Period Information

7. Reporting Period: From: **01/01/2013** To: **12/31/2017**

Budget Expenditures

8. Budget Expenditures:

	Federal Grant Funds	Non-Federal Funds (Match/Cost Share)
a. Previous Budget Period	$2,285,489.60	$420,000.00
b. Current Budget Period	395,673.21	$0
c. Entire Project Period (For Final Performance Reports only)	$2,681,162.81	$420,000.00

Indirect Cost Information

9. Indirect Costs

a. Are you claiming indirect costs under this grant? If yes, please indicate which of the following applies to your grant? ● Yes ❍ No

b. The grantee has an Indirect Cost Rate Agreement approved by the Federal Government: ● Yes ❍ No

The period covered by the Indirect Cost Rate Agreement is: From: **08/01/2017** To: **07/31/2018**

The approving Federal agency is: ● ED ❍Other *(Please specify):*

The Indirect Cost Rate is: **20.7%** Type of Rate *(For Final Performance Reports Only)*:

● Provisional ❍ Final ❍ Other *(Please specify):*

c. The grantee is not a State, local government, or Indian tribe, and is using the de minimus rate of 10% of modified total direct costs (MTDC) in compliance with 2 CFR 200.414(f)

❍ Yes ❍ No

d. The grantee is funded under a Restricted Rate Program and is using a restricted indirect cost rate that either:

❍ Is included in your approved Indirect Cost Rate Agreement ❍ Complies with 34 CFR 76.564(c)(2)?

e. The grantee is funded under a Training Rate Program and:

❍ Is recovering indirect cost using 8 percent of MTDC in compliance with 34 CFR 75.562(c)(2)

❍ Is recovering indirect costs using its actual negotiated indirect cost rate

Human Subjects (Annual Institutional Review Board (IRB) Certification) *(See instructions.)*

10. Is the annual certification of Institutional Review Board (IRB) approval attached? ❍ Yes ● No ❍ N/A

Performance Measures Status and Certification *(See instructions.)*

11. Performance Measures Status

a. Are complete data on performance measures for the current budget period included in the Project Status Chart? ● Yes ❍ No

b. If no, when will the data be available and submitted to the Department? (mm/dd/yyyy)

12. By signing this report, I certify to the best of my knowledge and belief that the report is true, complete, and accurate and the expenditures, disbursements, and cash receipts are for the purposes and objectives set forth in the terms and conditions of the Federal award. I am aware that any false, fictitious, or fraudulent information, or the omission of any material fact, may subject me to criminal, civil or administrative penalties for fraud, false statements, false claims or otherwise. (U.S. Code Title 18, Section 1001 and Title 31, Sections 3729-3730 and 3801-33812).Furthermore, to the best of my knowledge and belief, all data in this performance report are true, complete, and correct and the report fully discloses all known weaknesses concerning the accuracy, reliability, and completeness of data reported.

Name of Authorized Representative: **Hobart Harmon** Title: **RMEP Project Director**

Signature:  Date: March 29, 2018

Grant Performance Report (ED 524B) Executive Summary Attached

Rural Math Excel Partnership
Executive Summary (Final Performance Report)

Activities Carried Out

1. Trained 84 teachers of foundational math courses representing the 6 original LEA development sites and 2 additional LEA pilot demonstration sites in developing the model of shared responsibility for student support. This included training opportunities offered in summer training institutes, webinars, in modified DACUM sessions with 36 persons representing 35 different technician occupations in STEM and health-related fields, in technology management platform (i.e., MARi) sessions, at Family Math Night sessions, in on-site technical assistance for individual teachers at schools, and via ongoing phone and email communications.

2. Secured internet access for more than 8,000 students in cooperation with vendor (Verizon) and LEAs. This included establishment of a virtual private network (VPN) for teacher-assigned web-based homework, development of MARi teacher technology management platform in collaboration with Carney Labs, and creation of the RMEP website. For example, in 2016 the project maintained a VPN for filtering internet content on tablets, set up Google Apps for Education, and created email accounts for more than 1,000 students to be able to log into MARi and access Khan Academy videos, exercises and assessments.

3. Created repository of resources that included the Math Advanced Study Guide (MAS Guide) developed with the RMEP teacher development team, videos of STEM-H technicians explaining how math is used to complete their workplace tasks, Family Math Night protocols, webinars, PowerPoints and other project implementation supports.

4. Provided protocols, PowerPoints and direct assistance in counties of LEAs for community teams to plan and conduct community STEM-H careers event for students and their parents/families. This included developing the *Math at Work in Our Community* activity that engaged students in interviews with persons who live in the rural community and perform math competencies in their respective occupations.

5. Held meetings of the RMEP Advisory Leadership Team each year of the project to acquire suggestions on how to improve project implementation activities based on field experiences, lessons learned, and external evaluation findings. The team was comprised of representatives of the three role groups in the model, LEA superintendents, community colleges, business/industry representatives, and a member of the VASS, Inc. Board of Directors.

6. Revised shared responsibility model to address challenges of parent participation and principal support of teachers by transitioning many of the physical location activities (e.g., Family Math Night) to online activities. This revision included numerous applications of videos to assist students' parent/family members, math teachers, and the community event team in performing their respective responsibilities and functions in the model of shared responsibility.

7. Collaborated with videography and web vendors to create a revised website to make online and video-enhanced supports of model easily accessible and understandable, available at www.ruralmath.com. This new website also provides a video overview of the RMEP project and allows access to three password-protected portals for each of the responsibility role groups in the model: teachers; parents/family members; and community team members. URL access for selected resources are as follows:

www.ruralmath.com: Provides overview information about the project and a link to a video with an overview of the project. On this page is access to three password-protected portals for each of the role groups in the model: Teachers; Parents & Family; and Community.

http://ruralmath.com/about: Provides general RMEP history and a brief overview of the model.

http://ruralmath.com/current-sites: Provides descriptions of the two pilot demonstration sites – Accomack and Page Counties.

http://ruralmath.com/occupational-profiles: Contains occupational profiles and data for seven STEM-H job areas in the regions served by the RMEP project – Southside Virginia and Accomack and Page Counties.

http://ruralmath.com/community-demographic-profiles: Contains community demographic profiles for the regions served by the RMEP project – Southside Virginia and Accomack and Page Counties.

http://ruralmath.com/principal-videos: Contains 10 short video episodes designed and curated to give RMEP principals strategies for supporting innovative teachers.

http://ruralmath.com/teachers: Portal for teachers implementing RMEP. Resources include a welcome video and document; the Math Advanced Study Guide; a series of family engagement videos; and a series of videos of STEM-H technicians sharing how they use math in the workplace and examples of tools they use to conduct their daily duties.

http://ruralmath.com/parents-family: Portal for family members providing support to RMEP students. Resources include a welcome video and document; a series of family engagement videos; a series of videos of STEM-H technicians sharing how they use math in the workplace and examples of tools they use to conduct their daily duties; and online resources for exploring available STEM and health jobs and the training/certifications required to pursue them.

http://ruralmath.com/community: Portal for community organization members implementing RMEP. Resources include a welcome video and document; a community team orientation PowerPoint; a frequently asked question and answer document; and a description of the "Math at Work in our Community" activity.

https://vimeo.com/249817147/70ae16dc6c: Video highlighting the revised RMEP model; pilot site implementation of the model; and the online resources.

8. Partnered with 2 additional rural LEAs in the extension year of the project to pilot use of the revised website supports and model adaptations. This included providing a parent/family liaison consultant as support to facilitate ideas and activities that could encourage parent and family participation in key online and school or community activities.

9. Held RMEP special conference in 2016 titled "Supporting Student Success in Math for STEM Careers in Rural Communities" to share project results and recognize accomplishments of the original 6 school divisions (LEAs) and other partners. A panel comprised of a teacher, parent, principal, and community team member shared their experiences in developing the model of shared responsibility. A second panel, comprised of students, shared their experiences with Khan Academy homework assignments, family math nights, and community STEM careers events. In addition, during the conference, the project held a special training institute for math teachers of school divisions not among the RMEP partner divisions titled "Making Math Relevant for Students." A 30-minute videoconference webinar recognition event was held for the Page County Public Schools

pilot demonstration site on January 18, 2018. (Date and time of recognition event for Accomack County Public Schools pilot demonstration site was in process at time of this final project performance report submission.)

10. Collaborated with SRI external evaluators to accomplish conduct of external evaluation for years 1-4 of project. RMEP leadership received the SRI final external evaluation report on July 8, 2016, which is available at Evaluation of the Rural Math Excel Partnership Project: Final Report.

11. Performed numerous dissemination activities during the RMEP project period, including an annual newsletter (for example, see Rural Math Excel Partnership Newsletter, December 2016). Staff made presentations at meetings of in-state education conferences (e.g., Virginia School Boards Association, Annual Rural and Low-Income Schools Program Symposium), and at national and/or regional meetings of the National Council of Teachers of Mathematics and the National Rural Education Association. Two articles were published that noted work of RMEP, one entitled "The Math Learning Gap: Preparing STEM technicians for the New Rural Economy" in the peer-reviewed journal *The Rural Educator*, available at http://epubs.library.msstate.edu/index.php/ruraleducator/article/view/363/356. The second article, entitled "Rural Resources," was published in *Principal* magazine, available at https://www.naesp.org/principal-marchapril-2018-urban-suburban-rural-frontier/rural-resources.

12. Participated in USED i3 rural Community of Practice (CoP). During the 5 years of the project, RMEP staff participated in numerous CoP activities. This included serving on panels for presentations at national conferences to share i3 work, presenting in rural-specific sessions at the annual USED i3 Project Directors Meeting in Washington, DC, contributing to CoP webinars, posting project profiles and information on CoP website, and developing nationally important resource documents. For example, all RMEP staff participated in a 2-day meeting in Rockville, MD to contribute to the document *Leading Education Innovations in Rural Schools: Reflections from i3 Grantees*. The RMEP project director served as one of the lead authors of the document. Also, on behalf of the rural CoP, he prepared a document abstract and submitted the document into the ERIC data base (see https://files.eric.ed.gov/fulltext/ED577124.pdf).

13. Participated in monthly i3 phone conference calls with RMEP's USED i3 project officer during the 5 years, all quarterly or regularly scheduled meetings or calls with the USED-assigned technical assistance provider, and attended all USED annual Project Director meetings in Washington, DC.

Participants/Students Served

All students in the 6 original school divisions and the 2 additional pilot demonstration LEAs (in the extended year-five of the project) were considered "high need," based on the i3 definition of eligible "rural LEAs" required for participation in the federal Rural Low Income Schools Program. All RMEP LEAs were participants in the federal rural program. Consequently, all students in classes of teachers participating in the project were counted as served by the RMEP project. The table below shows number of students served and the percentage of students served by project year. Progress in percentage of students served increased as project adjustments were made to increase implementation fidelity of key elements of the shared responsibility model.

A combined total of 8,490 students compared to a target number of 13,839 students (61.3%) were served during the five years of the RMEP project (four implementation years plus 1 extension year). Project staff anticipated serving 5,250 students in year 1 based on the number of teachers (70) originally projected to participate from the 7 middle schools and 7 high schools of the 6 school divisions (LEAs). However, because year 1 became an implementation planning year for the project, no students were served in year 1. Therefore, the year 1 target was adjusted to 0 students served. In year 2, the target

number of students was again set to 5,250 based on a projected number of 70 teachers expected to participate in year 2. In the summer of year 3, the number of teachers participating in RMEP was adjusted downward from 79 teachers to 24 "implementation ready" teachers with approval from the i3 project officer. In the extension year (year 5), 4 teachers were added from 2 new LEAs that served as pilot demonstration sites. Because all LEAs in the RMEP project were participants in the federal Rural and Low Income School Program, all students in the schools from which teachers participated were classified as "high need" students. Consequently, all students in classes of teachers participating in the project were counted as served by the RMEP project.

The chart below shows the year-by-year figures used to determine the cumulative RMEP data reported under this measure. Targets represent estimates based on the total number of students anticipated to participate in eligible courses of the target number of teachers. The total percentage of students served rose dramatically in years 4 and 5 as the project made midcourse adjustments and, based on external evaluation results, worked with teachers that demonstrated evidence of "readiness" in implementing the project requirements with high fidelity. In year 4, both the targets and actuals reflect the students served by the 24 "implementation ready" teachers. In the year 5 extension period that focused on two additional pilot demonstration sites implementing revisions in the model of shared responsibility, 264 students were served. Thus, progress was achieved in percentage of students served with refinements in selection of teachers "most ready to implement" after more than 2 years of direct technical assistance to all teachers and with refinements in the model in the fourth year and extension year.

	Target # of Teachers	Actual # of Teachers	Target # of Students	Actual # of Students	Percentage of Targeted Students Served
Year 1*	0	0	0	0	0%
Year 2	70	79	5,250	2,639	50.2%
Year 3**	79	24	7,125	4,480	62.9%
Year 4	24	24	1,200	1,107	92.3%
Year 5 Ext.	4	4	264	264	100%
TOTALS	**74**	**83**	**13,839**	**8,490**	**61.3%**

* Year 1 was used as a planning year for RMEP.
** Total # of teachers adjusted to 24 "implementation ready" teachers for evaluation results started fall semester.

Grade levels of students served were grades 7-12. Because all students in classes of participating teachers were classified as "high need," no data were tracked for students with disabilities (SWD) or English Learners (EL students). Number of principals served was 18, the same as the number of middle schools (7) and high schools (7) in the original 6 implementations LEAs sites plus the number of middle schools (2) and high schools (2) of math teachers participating in the 2 pilot demonstration LEAs. Number of parents served ranged vastly among the schools and project activities. For example, parent participation in some schools in a Family Math Night or community STEM-H careers event exceeded 75% for students of participating math teachers. In other schools, parent participation was one-third or less of students enrolled in classes of participating math teachers.

Independent Evaluation

SRI International completed the external evaluation and submitted the final report on July 8, 2016. A copy was provided to the RMEP i3 project officer. Personnel of the independent evaluator organization, SRI International, forged an excellent collaborative relationship with RMEP staff. This relationship resulted in a successful VASS/SRI contract, a SRI data-sharing contract with the VA Department of Education, and an updated evaluation plan. External evaluators participated in RMEP staff meetings once per month. Evaluators provide updated information that was shared in the monthly conference call

with the USED i3 project officer. IRB and FWA requirement for research were achieved. Key highlights of the evaluation report are provided below:

1. Though an exceptionally high percentage of 79 teachers who participated in the 2014 two-day institute training rated the sessions highly, evaluators found that only about one-third of the teachers were able to implement their roles as originally planned. Some teachers required more direct assistance to address technology challenges and equity issues with students using tablets or gaining access to internet in the home environment. Some teachers perceived the need to address state Standards of Learning (SOL) in student instruction greatly limited their time available to make video-based homework assignments or conduct family math night activities.

Short length (4 instead of 5 years) of the project period and inability to increase staff support created a need for changes. Consequently, RMEP both reduced from 79 to 24 the number of teachers as implementation sites and intensified direct assistance to teachers in their classrooms and schools. The focus turned to the 24 "most ready to implement" teachers. All students in these classroom were provided a tablet, rather than only students who had no internet access at home. Teachers also developed additional options for students to complete the video homework assignments. Evaluators reported: *Once the RMEP staff decided to focus resources in fall 2015 on high-implementing teachers, SRI evaluators began to see more videos being assigned by teachers and completed by students. This finding suggests that the level of supports and resources necessary to promote buy-in and adoption by participants was greater than RMEP staff could meet at the original scale.*

2. Parent/family attendance at the family math nights proved to be the major challenge. Evaluation results revealed that: *The majority of the families who attended the FMNs across the 2 years reported that the events were worth attending and that the events helped with their understanding of STEM. In Year 2, 93 percent of students and 97 percent of parents reported that the event was worth attending. Similarly, 89 percent of students and 95 percent of parents said that the FMN helped them understand why STEM courses are important. Parent and student responses about the Year 3 FMNs mirrored the responses from Year 2.*

Results also revealed: *Though family attendance was often low, their positive evaluations and reports of the overall value of the FMNs indicate that parents and students perceived them as quality events, thus meeting the quality standard. However, teachers indicated that they would like additional support with improving family attendance and the evaluators shared this information with the RMEP team.* RMEP staff are now in the process of developing supports that might increase parent access to FMN activities and provide information about STEM careers.

3. Usually led by the county 4-H youth development specialist, all counties of RMEP partner school divisions were able to form a community STEM-H careers event team. Each team held at least one event. Some teams held three events over the project period. Two counties chose to plan and hold a combined event in which students in the two counties and their parents/families could attend. Evaluation results found: *Attendance at these events varied, often less well attended than the teams had hoped, and suggesting less responsiveness from communities. The majority of the families that attended the events in both years provided positive feedback about their experiences, indicating that the quality of the events was high*.

Evaluation results midway through the project revealed that more collaboration may be necessary between the teachers and community teams to gain the desired attendance and outcomes. Consequently, RMEP leadership provided special assistance to one county team in developing a specific activity called *Math at Work in Our Community*. Select team members met with the teachers and school principal to discuss a homework activity that would cause more interaction between the student, family members, and persons in the community who used math in their workplace. Students interviewed their

parents for ideas of people the student could interview. Students then interviewed the person, recorded the information on a card designed by the community team, and returned the card to the teacher. More than 170 students completed a card. The team used the information to plan the community event, which had the highest participation of any community event in the original 6 rural LEAs implementation sites. This activity was a required activity in the 2 pilot demonstration sites. The process was further refined in 1 pilot site to have students interview representatives of 16 businesses in the county during the community event held at the school, rather than have a parent/family member transport their student to a business site to conduct the interview prior to the community event activity.

4. The SRI evaluators reported on the four years of implementation in the original 6 LEAs (project years 2013-mid 2016). They found that the RMEP project had no statistically significant impact on students' achievement or attitudes. Evaluators give several possible reasons for these findings:

- There are differences between the content knowledge that the Virginia Standards of Learning (SOL) exams assess and the content emphasized by the RMEP project. It may appear that there was no or little improvement in student achievement because of these content differences.
- Due to state data limitations, the evaluators were not able to limit the sample to only those students whose teachers implemented the intervention in the 2015–16 school year (the high-implementing teachers). Any effect may have been diluted by the inclusion of scores from students who did not have access to the intervention because their teachers were not participating in the RMEP project in fall 2015.
- The RMEP project was only fully implemented in the fall 2015 semester, a short time period, which may have contributed to the lack of effect on achievement and attitudes.
- The small sample size of students may not have been large enough to detect a very small effect.

Clearly, the SRI evaluators found considerable evidence in survey results that select features of the shared responsibility model provided positive results for teachers, students and parents. RMEP leadership recognized from the start of the project that significant impact on state test scores was unachievable during the model's "development" phase. A major reason was that it was unlikely that all three role-group components of the model would be developed and implemented in any school division long enough to have collective impact on student test scores. In essence, it took three years of development to address challenges unique to each school division and teacher's classroom to arrive at what could be a "promising practice" innovation.

A conclusion of RMEP project staff is after further refinements are made in the model and after the support elements are more fully developed, one could expect teachers, parents and community members to be able to implement their shared responsibility roles with higher fidelity—and collectively this student support would achieve statistically significant impact on student attitudes, and math achievement if math competencies taught by teachers are clearly aligned with the assessment measure selected. Model refinements were tried by the pilot sites in the extension year. Continuous refinements in model elements (and related supports) was the RMEP journey as a "development" project.

The U.S. Department of Education provides an excellent publication to help school districts and other interested persons understand valid reasons when an innovation or intervention is said to have no effect on a certain intended outcome. This October 2016 publication is available at https://ies.ed.gov/ncee/pubs/REL_2017265/pdf/REL_2017265.pdf.

Progress in Goal/Objectives Attainment

In this section we summarize progress achieved on each project objective and the cost per student GPRA measure.

Objective 1: *Address foundational math content gaps required for graduates to pursue postsecondary preparation for careers that require advanced STEM courses*.

The performance measure was number of math teachers of Algebra I, Algebra II, Geometry, and Algebra Functions & Data Analysis courses in the 6 school divisions that make online homework assignments. An original target of 70 teachers in the original 6 implementation sites was established at the start of the project, and an additional 4 teachers were added as a target in the extension year (year 5). An actual number of 79 teachers began participation in RMEP in year 2 of the project. Of this group, 24 continued on as "implementation ready" teachers in year 3 of the project. In the extension year (year 5), 4 new teachers were added from 2 new pilot demonstration sites. Though slightly more than one-third (37.8%) of all teachers involved in the project made online homework assignments, the final project evaluation report reveals important progress after midcourse project adjustments, whereby all 24 "implementation ready" teachers assigned at least one Khan Academy video or exercise as homework. In the year 5 extension period, all 4 teachers in the 2 new LEAs assigned at least one Khan Academy video or other online exercise as homework. Each teacher also assigned students the new option of completing the "Math at Work in Our Community" assignment and related RMEP web-based videos for the model of shared responsibility.

Objective 2: Prepare selected high-implementation-ready teachers of Algebra I, Geometry, Algebra II, and Algebra Functions and Data Analysis (AFDA) courses in five middle schools and six high schools to integrate Khan Academy math videos and assessments into their lesson plans and subsequent student homework assignments.

The performance measure was number of math teachers of Algebra I, Algebra II, Geometry, and Algebra Functions & Data Analysis courses in the 6 school divisions that complete RMEP training. A participation target of 70 teachers was established for the 6 LEAs at the start of the project, but the actual number at start of year 2 was 79 teachers. All teachers from the original 6 LEAs completed training. By end of project, all teachers, including those added in the 2 new pilot demonstration LEAs, had completed training. A total of 84 teachers completed RMEP training (79 original participants, 1 new teacher in summer of year 3, and 4 new teachers in year 5 = 84 teachers). Thus, actual number of teachers completing the training exceeded the original estimate (i.e., 74) by 10 teachers.

Objective 3: Engage the parents/family members of students in Algebra I, Geometry, Algebra II, and AFDA courses in reinforcing the focus on students learning essential math competencies through completion of the online homework assignments.

The performance measure was number of students in Algebra I, Algebra II, Geometry, and Algebra Functions & Data Analysis courses in the 6 school divisions that complete online homework assignments. RMEP project data reveal that, of the 8,490 students served, 2,297 completed at least one online homework assignment (27.1%). Homework completion data does not apply to year 1 as no students were served that year. Homework completion data from year 2 for the original 79 teachers is not included in the actual performance data for this measure as it was not collected in MARi, the online homework management system made fully operational in year 3 and used for formal evaluation results. In year 3, a total of 926 students of the 4,480 served (20.7%) completed homework assignments online. In year 4, with midcourse project adjustments that focused on the 24 "implementation ready" teachers, all 1,107 of the 1,107 students served (100%) completed homework assignments online. In the year 5 extension year, all 264 students served by project teachers in the 2 LEAs completed homework assignments online.

Over the 5-year project period, our experiences in both the original 6 LEAs and the 2 pilot demonstration site LEAs in the extension year cause us to conclude that our original target of all students completing an online homework assignment was slightly unrealistic. Due to living in very

remote areas and/or areas outside of where the Verizon VPN with security could be implemented, a number of students were never able to do online homework assignments in their home locations, and some students in the 2 pilot sites faced the same challenge of no internet access at home. In some families, the internet time required for homework assignments created difficult choices in families with very limited data plans, forcing a tradeoff of time for the child to complete homework with other family members not having access to internet. The homework completion data from the MARi system is the most reliable data associated with our external evaluation. However, a higher student online homework completion rate may have been achieved but is unknown.

Objective 4: Engage representatives of community-based organizations in each LEA service area (i.e., school district) to reinforce to students and families the importance of math achievement to STEM-related careers.

The performance measure was number of community event teams that successfully form and conduct at least 1 community STEM careers event in the county of their respective school division(s). By the end of the 2016 spring semester all 5 counties comprising the original 6 school divisions (LEAs) had formed a STEM-H careers community event team and held at least one community event for students and their parents or family members. Thus, the external evaluation that ended in 2016 confirmed all school divisions had students participate in a community event held by the county community event team. In addition, each of the 2 new pilot demonstration sites formed community event teams and held a community STEM-H careers event for students (and families) of teachers in the project. Therefore, the target of 100% was achieved, in both the original 5 counties (6 LEAs) and in the 2 countywide LEAs that were in the extension year (year 5).

GPRA Performance Objective: Cost Per Student.

The performance measure was the cost per student actually served by the grant. The actual costs of the RMEP project included $2,681,162.81 in federal grant expenditures and $420,000 in non-federal matching expenditures for a total of $3,101,162.81. Actual evaluation costs were $460,000. Therefore, the actual cost per student for the entire grant period was $311.09, calculated as follows: total expenditures ($3,101,162.81) minus evaluation costs ($460,000) equal $2,641,162.81 divided by 8,490 served students = $311.09.

Progress in Competitive Preference Priorities

RMEP was a “rural priority” development grant that addressed two competitive priorities: (1) College Access and Success, and (2) Technology. Important progress was achieved. Solutions to technology problems and on-site teacher support by RMEP staff enabled all 24 teachers selected as high “implementation ready” in 11 schools of the 6 LEAs to make Khan Academy homework assignments. The review of external evaluation results and decision to refocus RMEP support on high implementation ready teachers greatly increased fidelity of implementation for the model of shared responsibility. All of the schools also were able to hold a family math night. All 5 counties were able to form community event teams and hold at least one event for students and their parents. These activities were instrumental to increase parent/family, student and community understanding of learning math as preparation for STEM-H careers. Consequently, the shared responsibility model holds promise for creating a postsecondary-going culture in high poverty rural places, where most residents have not understood the connection between math and preparation for modern occupations in the local community and rural region.

Numerous technology challenges were confronted, but the technology focus that enabled RMEP-served students to have internet access at home was a major advancement for these high poverty rural areas. Completing Khan Academy assignments as homework changed the role of parents from doing Algebra

with the child to supporting a positive home learning environment with access to web-based resources and career-related information. This is a doable parent role, one that also embraces the student's interest in technology. The technology challenges were many. But the RMEP project advanced both an instructional improvement issue (i.e., student motivation, math success) and an equity issue (internet access and postsecondary readiness), both critical issues for the future success and economic prosperity of students and their communities.

Key Challenges and Solutions

The most critical challenges confronting project implementing in the 6 LEA implementation sites were addressing technology problems, supporting teacher implementation at the school level, increasing parent/family participation, and establishing a viable community event team in one county.

1. Technology issues continued to hamper project implementation through spring semester of year 3 for the vast majority of project teachers.

Solution: Based on evaluation results and need to improve implementation fidelity of the shared responsibility model, major changes were advanced to increase success with high implementing ready teachers. RMEP staff retrieved all tablets from the schools in May of year 3 and worked over the summer to reset them to factory settings. A virtual private network (VPN) was created in partnership with Verizon and GCR Company to enable internet filtering without the use of specific software on tablets. This basically negated the issue of students' hard resetting tablets to get around internet filtering because the filter was incorporated into the 4G network instead of in software that can be removed from the device. However, this solution only worked for students able to get a strong Verizon data signal at home. Thus, staff worked with the affected teachers to make assignments a week in advance and allow students without an internet signal at home time during the school day to complete the online homework while at school on the school division's Wi-Fi network. In addition to the creation of the VPN, RMEP staff worked with Verizon to test and use new software that limited data usage to 1 gigabyte of data per month per tablet and limited access to apps on the device that would use a great amount of data (e.g., YouTube, music streaming, social media). Staff also collaborated with MARi partners to improve user experience of the platform. This allowed assignments to be made by teachers and completed by students more effectively.

2. Supporting teachers adequately with technical assistance was a major challenge, especially in years 1-3. Evaluation results revealed many teachers found it difficult to establish student internet access accounts in the MARi system and/or make the Khan Academy homework assignments. In most instances, RMEP staff had to set up the accounts for teachers with their students in computer labs at the school, which made scheduling a critical issue in schools with limited lab space. For most teachers, planning a family math night was a new role. The majority of teachers had little experience in doing such parent outreach. Teachers also had limited time available for planning in a collaborative group. Some teachers perceived the extra work and time would provide inadequate benefit for improving student performance on state standards of learning tests. Many teachers perceived that all of their time was needed to focus on classroom instructional activities rather than on RMEP project implementation.

Though RMEP staff visited schools to provide assistance, many teachers were unable to reach an adequate degree of readiness in making the homework assignments and in planning and conducting family math night activities. In numerous cases, RMEP staff also had to be key presenters in the events. Most teachers lacked experience and were particularly challenged in making a presentations to adults. RMEP staff also had to assist the teachers in making contact with persons in the private sector (e.g., technicians) who could come to present at the family math night events. Sending a letter home was the preferred method to "inform" parents of the family math night. Numerous teachers had little time, even if they saw it as their responsibility, to invest in reaching out to parents in other ways.

Solution: RMEP staff decided to invest the limited human and fiscal resources available at school sites where teachers were more ready to fully implement teacher functions of the shared responsibility model. Evaluation results revealed that certain teachers appeared more "ready" in achieving desired implementation fidelity. Providing support for these teachers to achieve success was determined essential to build capacity for model implementation as a promising practice. Therefore, a cohort of 24 high implementation-ready teachers was selected, trained in a 2015 summer professional development activity, and targeted for intensive support by the RMEP math specialist and technology support staff during the fall semester of 2015.

3. The process of preparing students for accessing assignments in MARi was greatly hampered by the fact that many students had no email addresses to use for the accounts, and students often forget their log-on credentials after accounts were created.

Solution: By setting up Google Apps for Education (a free platform for user accounts), RMEP staff was able to easily upload teacher roster spreadsheets to create uniform G-mail addresses for all students of the more ready teachers. Staff then worked with MARi personnel to create MARi student accounts. This greatly reduced the amount of time spent getting students ready for participation – no time was needed during classroom instruction to set up accounts. Rather, RMEP staff was able to visit classrooms to merely help students log in for the first time and experience what it was like to complete an online homework assignment via MARi. Having uniform email accounts and passwords also improved students' ability to remember log in information and do their online homework more regularly. In addition, since all students in high-implementing teacher classrooms were given tablets, there was no need for surveying students to ascertain internet access at home. Removal of this survey reduced time demands on both teachers and RMEP staff, thus accelerating teacher assignment of Khan Academy videos, exercises and assessments as homework earlier in the semester.

4. Increasing parent participation was a significant challenge. Conducting a family math night, though seen as desirable by most teachers, also was an add-on to the teaching load. Time constraints greatly hindered planning such an activity for even the best intended teacher. RMEP staff provided the additional support at each school to conduct a family math night. Gaining parent participation in a high poverty rural setting consistently required new support strategies for teachers. Community event teams also struggled with how to "reach out" to parents, though some teams explored using more personal and direct approaches (compared to only sending a letter home via students).

Solution: With time and experience, some teachers and community teams evolved strategies to increase parent involvement. All schools of the 24 high implementation ready teachers were able to hold a family math night. Though a class "parent outreach advocate" was considered as a strategy, this was perceived to again add to the workload of the individual teacher and unsustainable. Thus, RMEP staff concluded parent involvement strategies required a greater use of videos and web-based resources on the project website to provide parents/families an online option to the original on-site (e.g., school) strategy planned for the model. Vendors were used to produce the technology enhancement of support (videos and website).

5. After one county worked for 3 years to establish a viable community event team, RMEP staff concluded formation of a community team and its advancement may be more viable if the team leadership can partner with an economic development partner (county government office or Chamber of Commerce) to advance an activity that can focus team members. The strategy could also serve to focus meeting time on "doing" rather than planning. RMEP staff also learned it is easy to underestimate the time a 4H youth development specialist may have to lead the community event team. Gaining focus early on an activity also helped team members share the load and commit time to performing necessary team responsibilities.

Solution: Two strategies appeared most promising. One strategy involved the team leader focusing team planning on a specific idea rather than brainstorming ideas in several meetings. Team leader collaboration with a Chamber of Commerce or economic development organization in formulating the idea proved advantageous. This seemed to facilitate the team coalescing around a “let’s try it” action-oriented attitude that fostered refinement/improvement of event planning and selection of who in the community can help conduct the community event (e.g., technicians in different STEM occupations as presenters). A second viable strategy was for the team to intentionally collaborate with math teachers at the school(s) to involve students and their parents and a community resident in a homework activity. This led to development of the “Math at Work in Our Community” as teacher-assigned student homework that required involvement of parents and businesses in the rural community. This activity must be initiated and facilitated by the community event team, as a responsibility, and not managed as a teacher responsibility.

RMEP Final Performance Report
Project Status Chart on ED524B Form

Section A: Performance Objective Information

Reporting for i3 *GPRA* Measure 1

1. Performance Measure	Measure Type	Quantitative Data					
The number of students served by the grant.	*GPRA*	**Target**			**Actual Performance Data**		
		Raw Number	**Ratio**	**%**	**Raw Number**	**Ratio**	**%**
		13,839	13,839/ 13,839	100	8490	8490 /13,839	61.3

Explanation of Progress:
A combined total of 8,490 students compared to a target number of 13,839 students (61.3%) were served during the five years of the RMEP project (four implementation years plus 1 extension year). Project staff anticipated serving 5,250 students in year 1 based on the number of teachers (70) originally projected to participate from the 7 middle schools and 7 high schools of the 6 school divisions (LEAs). However, because year 1 became an implementation planning year for the project, no students were served in year 1. Therefore, the year 1 target was adjusted to 0 students served. In year 2, the target number of students was again set to 5,250 based on a projected number of 70 teachers expected to participate in year 2. In the summer of year 3, the number of teachers participating in RMEP was adjusted downward from 79 teachers to 24 "implementation ready" teachers with approval from the i3 project officer. In the extension year (year 5), 4 teachers were added from 2 new LEAs that served as pilot demonstration sites. Because all LEAs in the RMEP project were participants in the federal Rural and Low Income School Program, all students in the schools from which teachers participated were classified as "high need" students. Consequently, all students in classes of teachers participating in the project were counted as served by the RMEP project.

The chart below shows the year-by-year figures used to determine the cumulative RMEP data reported under this measure. Targets represent estimates based on the total number of students anticipated to participate in eligible courses of the target number of teachers. The total percentage of students served rose dramatically in years 4 and 5 as the project made midcourse adjustments and, based on external evaluation results, worked with teachers that demonstrated evidence of "readiness" in implementing the project requirements with high fidelity. In year 4, both the targets and actuals reflect the students served by the 24 "implementation ready" teachers. In the year 5 extension period that focused on two additional pilot demonstration sites implementing revisions in the model of shared responsibility, 264 students were served. Thus, progress was achieved in percentage of students served with refinements in selection of teachers "most ready to implement" after more than 2 years of direct technical assistance to all teachers and with refinements in the model in the fourth year and extension year.

	Target # of Teachers	Actual # of Teachers	Target # of Students	Actual # of Students	Percentage of Targeted Students Served
Year 1*	0	0	0	0	0%
Year 2	70	79	5,250	2,639	50.2%
Year 3**	79	24	7,125	4,480	62.9%
Year 4	24	24	1,200	1,107	92.3%
Year 5 Ext.	4	4	264	264	100%
TOTALS	**74**	**83**	**13,839**	**8,490**	**61.3%**

* Year 1 was used as a planning year for RMEP.
** Total # of teachers adjusted to 24 "implementation ready" teachers for evaluation results started fall semester.

Reporting for i3 *GPRA* Measure 4

1. Performance Measure	**Measure Type**	**Quantitative Data**					
The cost per student actually served by the grant	*GPRA*	**Target**			**Actual Performance Data**		
		Raw Number	**Ratio**	**%**	**Raw Number**	**Ratio**	**%**
		$192.49	/		$311.09	/	

Explanation of Progress:
During the grant, the project targeted 13,839 students and served a total of 8,490 students as explained in the notes for GPRA measure 1 above. The RMEP grant budget was $2,703,880.79 in federal funds and $420,000 in non-federal private sector matching funds. The total budgeted for the external evaluation was $460,000. Therefore, the target cost per student was $192.49, calculated as follows: $2,703,880.79 in federal + $420,000 in matching = $3,123,880.79 - $460,000 in evaluation = $2,663,880.79 divided by 13,839 targeted students = $192.49.

The actual costs of the RMEP project included $2,681,162.81 in federal grant expenditures and $420,000 in non-federal matching expenditures for a total of $3,101,162.81. Actual evaluation costs were $460,000. Therefore, the actual cost per student for the entire grant period was $311.09, calculated as follows: total expenditures ($3,101,162.81) minus evaluation costs ($460,000) equal $2,641,162.81 divided by 8,490 served students = $311.09.

Reporting for Project-Specific Measures

1. Project Objective: [x] Check if this is a status update for the previous budget period

Address foundational math content gaps required for graduates to pursue postsecondary preparation for careers that require advanced STEM courses.

1a. Performance Measure	Measure Type	Quantitative Data					
		Target			Actual Performance Data		
Number of math teachers of Algebra I, Algebra II, Geometry, Algebra Functions & Data Analysis courses in the 6 school divisions that make online homework assignments	Project	**84**	**84/84**	**100%**	**28**	**28/84**	**33.3%**

Explanation of Progress:
As described in the explanation of progress notes for measure #1 above, an actual number of 79 teachers began participation in RMEP in year 2 of the project. Of this group, 24 continued on as "implementation ready" teachers in year 3 of the project. In the extension year (year 5), 4 new teachers were added from 2 new pilot demonstration sites. Though slightly more than one-third (33.3%) of all teachers involved in the project made online homework assignments, the final project evaluation report reveals important progress after midcourse project adjustments whereby all 24 "implementation ready" teachers assigned at least one Khan Academy video or exercise as homework.

Regarding the original 79 teacher participants, evaluation results and staff experiences revealed that a majority of these teachers were not likely to progress to a level of implementation fidelity to enable testing of the evolving model of shared responsibility under development in the RMEP project. Therefore, based on external evaluation results, limited project capacity to continue providing direct technical assistance at schools to low readiness teachers, and input from project advisory committee members, the total number of teachers was reduced to the 24 most "implementation ready" teachers, with approval of the i3 project officer. Therefore, these 24 "implementation ready" teachers in the original 6 LEAs comprised the teacher population for the second half of year 3 and for year 4. The external evaluation, which concluded its final project evaluation report in year 4, noted that all 24 teachers assigned at least one Khan Academy video or exercise as homework.

In the year 5 extension period, all 4 teachers in the 2 new LEAs assigned at least one Khan Academy video or other online exercise as homework and assigned students the new option of completing the Math at Work in Our Community assignment and related RMEP web-based videos for the model of shared responsibility.

Actual performance data for this measure reflects the capture of online homework assignments of the 24 "implementation ready" teachers in the original 6 LEAs and the additional 4 teachers participating from pilot demonstration sites in the year 5 extension period. Homework assignment information for the 24 "implementation ready" teachers was extracted from MARi, officially introduced to the RMEP project in year 3 as the online homework management system. Homework assignment information from the 4 teachers participating in the 2 pilot demonstration sites was verified using informal feedback from the teachers.

2. Project Objective: [x] Check if this is a status update for the previous budget period

Prepare selected high-implementation-ready teachers of Algebra I, Geometry, Algebra II, and Algebra Functions and Data Analysis (AFDA) courses in five middle schools and six high schools to integrate Khan Academy math videos and assessments into their lesson plans and subsequent student homework assignments.

2a. Performance Measure	**Measure Type**	**Quantitative Data**					
Number of math teachers of Algebra I, Algebra II, Geometry, Algebra Functions & Data Analysis courses in the 6 school divisions that complete RMEP training	Project	**Target**			**Actual Performance Data**		
		Raw Number 74	**Ratio 74/74**	**100%**	**Raw Number 84**	**Ratio 84/74**	**113.5%**

Explanation of Progress:
An original participation target of 70 teachers was established at the start of the project, but the actual number at start of year 2 was 79 teachers. All teachers from the original 6 LEAs completed training. By end of project, all teachers, included the new ones added in the 2 new pilot demonstration LEAs, had completed training.

An additional 4 teacher participants from 2 new pilot demonstration site LEAs were added as a target in the extension year. Thus, 84 is actual number of teachers involved during the 5-year project period. The original target above reflects a total unduplicated count of the year-one estimated 70 plus 4 teachers as participants in RMEP training. As described in the explanation of progress notes for measure #1 above, an actual number of 79 teachers began participation in RMEP in year 2 of the project. Of this group, 24 were selected as "implementation ready" teachers during year 3 of the project. One of the original 24 were not able to continue participation after training, but a new teacher was added and trained that summer. In the extension year (year 5), 4 new teachers were added, as anticipated. A total of 84 teachers completed RMEP training (79 original participants, 1 new teacher in summer of year 3, and 4 new teachers in year 5 = 84 teachers). Thus, actual number of teachers completing the training exceeded the original estimate (i.e., 74) by 10 teachers.

SRI evaluators attended the 2015 summer training and conducted a survey of participants. They reported the following about the "implementation ready" teacher group, which SRI refers to as "high implementation" teachers (HI): "Most HI teachers (87.5%) strongly agreed that the workshop was well organized, that the purpose of the workshop was clear to them (83%), and that they planned to apply what they learned from the PD workshop in their classroom (87.5%)." All "implementation ready" teachers agreed that the activities conducted during the workshop were very helpful or somewhat helpful. In particular, exploring MARi (75%), choosing appropriate Khan Academy videos (75%), and discussing and planning FMN (79%) were rated as very helpful by "implementation ready" teachers. MARi data reveal all 24 of these teachers did make Khan Academy homework assignments in the fall of 2015, compared to only about one-third of all 79 teachers in year 2 of the project making online assignments.

In the year 5 extension, the 4 teachers in the 2 new LEAs completed training provided by the RMEP math specialist and project manager to use the revised RMEP website. This training included numerous phone and electronic communications and direct technical assistance as necessary.

3. Project Objective: [x] Check if this is a status update for the previous budget period

Engage the parents/family members of students in Algebra I, Geometry, Algebra II, and AFDA courses in reinforcing the focus on students learning essential math competencies through completion of the online homework assignments.

3a. Performance Measure	**Measure Type**	**Quantitative Data**					
Number of students in Algebra I, Algebra II, Geometry, Algebra Functions & Data Analysis courses in the 6 school divisions that complete online homework assignments	Project	**Target**			**Actual Performance Data**		
		Raw Number 8490	**Ratio 8490/8490**	**100%**	**Raw Number 2,297**	**Ratio 2,297/8490**	**27.1%**

Explanation of Progress:
RMEP project data reveal that 2,297 of the 8,490 students served by the project completed at least one online homework assignment (27.1%). Homework completion data does not apply to year 1 as no students were served that year. Homework completion data from year 2 for the original 79 teachers is not included in the actual performance data for this measure as it was not collected in MARi, the online homework management system made fully operational in year 3 and used for formal evaluation results. In year 3, 926 students of the 4,480 served (20.7%) completed homework assignments online. In year 4, with midcourse project adjustments that focused on the 24 "implementation ready" teachers, all 1,107 of the 1,107 students served (100%) completed homework assignments online. In the year 5 extension year, all 264 students served by project teachers in the 2 LEAs completed homework assignments online.

For the original 6 participating LEAs, the Verizon contract that provided internet access for students using project tablets ended in spring semester 2016; therefore, data on homework assignments is available only through spring semester 2016, as entered into and reported using the MARi system. Homework assignment completion for students in the pilot demonstration sites was verified using informal feedback with the 4 participating teachers in the 2 LEAs.

An important finding in the development of the original RMEP model was that not all students have internet access in their homes – a prevalent issue in rural school communities. To help mitigate this challenge, one modification implemented during the extension year in the 2 pilot demonstration sites was the option for teachers to allow students without home internet access to complete online assignments as class-led activities using the tablets. It was the intention in the 2 new pilot demonstration sites to provide teachers with greater flexibility in how students could complete a homework assignment, with key resources placed on the project website. Moreover, all or selected activities of the family math night and community event (e.g., Math at Work in Our Community activities) could be performed via instructions on the revised website. No formal evaluation was conducted to determine exact student and or family participation in this new option. The project's formal external evaluation was completed by SRI International in year 4. In year 5, informal teacher feedback revealed all students completed some form of homework activity using the tablet, a home computer, or in a location with internet access.

Over the 5-year project period, our experiences in both the original 6 LEAs and the 2 pilot demonstration site LEAs in the extension year cause us to conclude that our original target of all students completing an online homework assignment was slightly unrealistic. Due to living in very remote areas and/or areas outside of where the Verizon VPN with security could be implemented, a number of students were never able to do online homework assignments in their home locations, and some students in the 2 pilot sites faced the same challenge of no internet access at home. In some families, the internet time required for homework assignments created difficult choices in families with very limited data plans, forcing a tradeoff of time for the child to complete homework with other family members not having access to internet. The homework completion data from the MARi system is the most reliable data associated with our external evaluation. However, a higher student online homework completion rate may have been achieved but is unknown.

4. Project Objective: [ ] Check if this is a status update for the previous budget period

Engage representatives of community-based organizations in each LEA service area (i.e., school district) to reinforce to students and families the importance of math achievement to STEM-related careers.

4a. Performance Measure	Measure Type	Quantitative Data					
		Target			Actual Performance Data		
Number of community event teams that successfully form and conduct at least 1 community STEM careers event in the county of their respective school division(s)	Project	**Raw Number 7**	**Ratio 7/7**	**100%**	**Raw Number 7**	**Ratio 7/7**	**100%**

Explanation of Progress: By the end of the 2016 spring semester all 5 counties comprising the original 6 school divisions (LEAs) had formed a STEM-H careers community event team and held at least one community event for students and their parents or family members. Thus, the external evaluation that ended in 2016 confirmed all school divisions had students participate in a community event held by the county community event team.

In addition, each of the 2 new pilot demonstration sites formed community event teams and held a community STEM-H careers event for students (and families) of teachers in the project. Therefore, the target of 100% was achieved, in both the original 5 counties (6 LEAs) and in the 2 countywide LEAs that were in the extension year (year 5).

Section C. Additional Information:

Final Performance Report Questions

1. What would you attribute as the single greatest accomplishment of your i3 grant?

During the five years, we had many accomplishments. Among the most significant was in year 1 we successfully conducted two modified DACUM (i.e., Develop A CurriculUM) sessions that included a total of 36 persons representing 35 different STEM-H technicians to determine the specific math competencies they used in performing their job. Our RMEP math specialist consequently worked successfully with a development team of teachers representing the participating LEAs in the project to produce a matrix of these competencies to reveal four gaps in math content knowledge. We also published the results in a peer-reviewed journal. Article citation is Harmon, H. L. & Wilborn, S. C. (2016). The math learning gap: Preparing stem technicians for the new rural economy. *The Rural Educator, 37*(3), 26-40 available at http://epubs.library.msstate.edu/index.php/ruraleducator/article/view/363/356.

The development team, led by our RMEP math specialist, developed the Math Advanced Study Guide that incorporated the identification of Khan Academy videos and related exercises that could support the math competencies. Our project manager and media specialist also helped produce the guide. The math application exercises in the guide were valuable aids for teachers. For most teachers, this was their first knowledge of how math competencies they taught were related to the jobs performed in the workplace and helped them answer the question for students: "Why do I need this math?" Videos featuring select technicians explaining how they used math in their daily workplace tasks were produced for use by teachers in the math classroom. These videos were also very valuable for Family Math Night and community events.

In addition to the guide and videos, a major accomplishment was the new project website that provided teachers, as well as students, families, and community event teams, with more easily-accessible online resources. This new website was introduced with the 2 LEAs and teachers that were added to the project as pilot demonstration sites in the extension year. Thus, the extension year gave us the opportunity in this i3 development project to further develop and refine the new resources and website. The intent was to overcome barriers in the original 6 LEAs of parents and students in attending the Family Math Night activity, and in teachers who struggled to find time to conduct the activity. Thus, by project end in December 2017, the extension year and new website laid the foundation for increasing implementation fidelity of the model of shared responsibility under development in the project. The revised website of resources is available at: www.ruralmath.com.

By the end of the project, refinements in the model of shared responsibility embraced greater use of videos to help guide teachers, parents/families of students, and community event teams in performing their specific responsibilities (i.e., roles and functions). To prepare for pilot demonstration sites to implement the revised RMEP model, VASS worked with a contractor to create the www.ruralmath.com website that houses all of the resources and supports necessary to carry out RMEP roles and functions. Some of the key features and resources of the site are:

www.ruralmath.com: Provides overview information about the project and a link to a video with an overview of the project. On this page is access to three password-protected portals for each of the role groups in the model: Teachers; Parents & Family; and Community.

http://ruralmath.com/about: Provides general RMEP history and a brief overview of the model.

http://ruralmath.com/current-sites: Provides descriptions of the two pilot demonstration sites – Accomack and Page Counties.

http://ruralmath.com/occupational-profiles: Contains occupational profiles and data for seven STEM-H job areas in the regions served by the RMEP project – Southside Virginia and Accomack and Page Counties.

http://ruralmath.com/community-demographic-profiles: Contains community demographic profiles for the regions served by the RMEP project – Southside Virginia and Accomack and Page Counties.

http://ruralmath.com/principal-videos: Contains 10 short video episodes designed and curated to give RMEP principals strategies for supporting innovative teachers.

http://ruralmath.com/teachers: Portal for teachers implementing RMEP. Resources include a welcome video and document; the Math Advanced Study Guide; a series of family engagement videos; and a series of videos of STEM-H technicians sharing how they use math in the workplace and examples of tools they use to conduct their daily duties.

http://ruralmath.com/parents-family: Portal for family members providing support to RMEP students. Resources include a welcome video and document; a series of family engagement videos; a series of videos of STEM-H technicians sharing how they use math in the workplace and examples of tools they use to conduct their daily duties; and online resources for exploring available STEM and health jobs and the training/certifications required to pursue them.

http://ruralmath.com/community: Portal for community organization members implementing RMEP. Resources include a welcome video and document; a community team orientation PowerPoint; a frequently asked question and answer document; and a description of the "Math at Work in our Community" activity.

https://vimeo.com/249817147/70ae16dc6c: Video highlighting the revised RMEP model; pilot site implementation of the model; and the online resources.

2. What was the most difficult obstacle that you encountered during your project period? Do you have any advice for future i3 grantees in how to prepare for the obstacle noted?

Because the original model of shared responsibility required teachers to make Khan Academy video (and exercises/assessments) and students to complete the assignments in the home environment, our greatest challenge was addressing the fact that some students do not have internet access at home.

Original plans called for students who did not have access to internet at home to be provided internet access paid for with project funds. As a result, project staff deemed it necessary to survey students to identify which of them needed internet to be provided by the project. This task was laborious and time-consuming whether conducted via paper and pencil or by online surveys. By the time teachers and administrators were able to survey students and provide the data to project staff for purchasing and distributing tablets, much of the semester had elapsed, and then, where schools were on a 4x4 block schedule, it was time for the state mandated Standards of Learning (SOL) tests. In one LEA, the school board considered it an equity issue to provide tablets only to students served in the RMEP project, rather than providing tablets to all students in the division. In addition, some teachers were hesitant to assign Khan Academy homework to the whole class when they were aware that a few students did not have access to internet at home. All of these circumstances greatly slowed project start-up in year one and carried over into year two of the project until staff deemed it necessary to provide every student served with a tablet and attached data plan for doing homework assignments.

Future grantees might conduct a needs assessment early in the project, perhaps even before proposing a project, to fully understand home internet access rates for all students/families involved. Particularly in rural communities, providing affordable, unlimited internet access to every home remains a pervasive challenge; therefore, a project plan that requires every student to have internet access in his/her home will likely be difficult to implement. In the RMEP project, it was necessary to have multiple accommodations and options such as providing students/families with devices to connect to Wi-Fi, providing lists of possible locations for accessing free Wi-Fi in their communities (such as the library, McDonalds, Starbucks, etc.), giving students opportunities to use provided devices during or just after school on the school's Wi-Fi network, and even giving students an extended period of time to get online homework done (which gave them more opportunity to access the internet at a location outside of the home).

A second technology challenge was ensuring adequate filtering of internet content (as required by federal law) to protect and prevent students from accessing inappropriate online content. Managing student access via a software filter or virtual private network (VPN) is also important because student and teacher data usage must be limited to project activities to prevent unreasonable project costs. A related issue was that students found ways to get around the software filter and were able to hard reset tablets in order to access non-project-related websites. This security issue caused many teachers concern over repercussions they might face if students gained access to inappropriate content, and management of the devices and data usage was difficult and time-consuming for project staff. Consequently, the creation and implementation of a filtered VPN, in partnership with Verizon, provided a workable solution for the majority of students served in years 3 and 4.

Future grantees are advised to know and plan for all potential issues from the start of their project implementation. This includes testing and gaining an intimate knowledge of the technology devices and how they will be used by students – perhaps through a pilot study with a small group – as well as conducting needs assessments and planning for the creation/use of a VPN.

A third technology challenge was that teachers desired a technology management platform to efficiently and effectively assign and track homework completion. Teachers were reluctant to assign homework without being able to hold students accountable for completing assignments.

Project staff provided a great deal of technical assistance including setting up student accounts in Khan Academy, Google, and MARi, helping students log in and use the platform, assisting teachers in making and tracking assignments, etc. Few teachers were highly comfortable using web-based resources such as Khan Academy, and some became frustrated with what they felt was "time wasted" in their normal instructional day. The MARi management platform was created in partnership with an outside company to allow teachers to find, assign, and track Khan Academy videos and assessments; however, development of such an application requires extensive testing and changes, and some teachers disliked being involved in such an ever-changing effort. Over the course of the project, there were numerous changes in the functionality and use of MARi as teachers suggested to the company more ways to make implementation simpler. The platform provider was very generous in contributions of time and talent in continuously revising the platform functions, but some teachers felt that they did not have adequate time for learning and implementing the changes.

These consistent technology issues played a major role in the project evolving to having fewer teachers participate by the middle of year 3. As previously mentioned, 24 "implementation ready" teachers were selected in the summer of year 3 in hopes of increasing implementation fidelity of the shared responsibility model. The change in plans included giving tablets to all students in the participating teachers' classrooms and the creation of the VPN for filtering content and managing data usage.

3. What were your overall lessons learned from your i3 grant?

The RMEP project team worked with the i3 rural community of practice to produce the September 2017 report entitled *Leading Education Innovations in Rural Schools: Reflections from i3 Grantees*, available in the ERIC data base at: https://files.eric.ed.gov/fulltext/ED577124.pdf.

In this final project performance report, we offer some general lessons learned, some lessons learned specific to the role performed by RMEP project personnel, and lessons learned from our pilot demonstrations sites through an external consultants viewpoints.

A. General Lessons Learned

1. Technology infrastructure and tools must be created/identified and pilot-tested before teachers are trained and expected to use the technology features with students. Solutions to technology challenges must be resolved quickly. Early failures by teachers in using the technology will raise teacher frustration. Resistance to use will increase rapidly, particularly if a teacher has, at the start of the project, a low comfort level in using technology or views the time demands as excessive.

2. Teachers will use the most efficient method available to seek assistance when struggling to accomplish their role in the shared responsibility model but will prefer face-to face direct assistance at their school rather than rely on written materials such as those provided initially in the Math Advanced Study Guide.

3. Most teachers are capable of planning a Family Math Night but many are not comfortable presenting or speaking to adults; instead, they will prefer someone else to speak in front of parents, especially regarding details of the project itself.

4. Aligning mathematics curricula, giving teachers opportunities to discuss issues of student content mastery, sharing of successful instructional strategies, and counseling middle and high school students about technician-level occupations and STEM-related careers appear necessary. Many of the math competencies used by STEM-related technicians in the workplace require student mastery of math content in courses taught prior to the high school level Algebra I course.

5. Parents are very concerned about what education students need for careers and will highly value the *Dream It Do It*: *Budget Your Life* activity conducted as part of Family Math Night. This activity takes the individual through a series of questions to determine the cost and therefore the annual salary required for a desired lifestyle. The application then allows the student/parent to explore various careers that provide such a salary and even locate training programs to obtain the degree or certifications necessary for the job.

6. Formation of a community STEM careers event team and the team successfully holding an event may be more viable if the team leadership can partner with an economic development entity (i.e., a county office or Chamber of Commerce) to advance an activity that can focus team members. The activity can serve to focus meeting time on "doing" rather than planning. It is easy to underestimate the time a 4-H youth development specialist may have to lead a team. Activity-focused smaller teams may help the team members share the load and commit time to performing certain team responsibilities.

B. Lessons Learned by Project Personnel Role

RMEP Staff and Consultant	Lessons Learned
Sue Adams (media specialist)	It is very important to have an online presence, especially for a project that encompasses a large region. Interested parties need to be able to find "you" online within a few seconds of beginning their search or they will go elsewhere. VASS, with its two websites, is able to reach all audiences and provide them with material that is appropriate and timely.
Hobart Harmon (project director)	Use of external evaluation results is essential in all facets of the project to make the difficult team decisions that keep a development project on track with its purpose and intended outcomes.
Dorothea Shannon (consultant/project co-director)	After interviewing central office staff in the participating RMEP school divisions it was evident the most successful schools were those where teachers, principals and key central office staff understood the project and implemented the project with fidelity.
Jennifer Stevens (project manager, technology	Implementing a research and development project in a public school has lots of challenges, and implementing one where technology is an integral part of the project is extremely challenging. Having the opportunity to test the

support)	technology and work out the "kinks" as much as possible with a smaller group of teachers and students is a key strategy for ensuring overall success with the larger population.
Veronica Tate (project co-director)	A new educational endeavor, such as a development project, will experience implementation challenges which may cause frustration and negatively impact morale among participating practitioners. Clear and timely communication about such challenges between project staff and participants is important to help identify appropriate adjustments that maintain the integrity of the project model while addressing unanticipated issues as they develop.
Sandy Wilborn (math specialist)	My greatest lessons learned in working with the development team of math teachers was the realization of how valuable hearing from technicians about how math is used in the workplace was to teachers, and in working with technicians that the majority of the math competencies used by STEM-H technicians are taught in Algebra 1 or before.

C. Lessons Learned in Pilot Sites: Consultant Viewpoints

Teachers in the 2 pilot demonstration sites added in the extension year of the project had only one semester to receive training on the model, acquire the tablets and implement the revised model and use website resources with students. For the pilot sites, we employed a consultant to provide additional assistance. Doris "Gabie" Frazier, former coordinator of the Rural Education Achievement Program (REAP) and Title I specialist in the Virginia Department of Education, provided a summary of her observations of and participation in the Family Math Nights and the STEM-H careers community events for the semester with the 2 pilot demonstration sites. We offer her perspectives as lessons learned, by pilot site, as each site was free to conduct activities consistent with its rural context and capacities.

1. Lessons learned regarding strategies and/or activities that will appeal most to parents in the *Family Math Night* include holding event in home school; using automated calls to alert parents of the upcoming activity; having students distribute flyers to their parents; featuring students in sharing information learned about specific jobs and required math skills; using electronic devices in session activities; providing finger foods for students, parents, and family members; facilitating the "Budget Your Life" activity that engages discussion with parents and students; and introducing to parents' their role in the upcoming community STEM-H careers event.

2. Lessons learned regarding strategies and/or activities that will appeal most to parents in the *STEM-H careers community event* include using automated calls to alert parents of the upcoming event; having students distribute flyers to their parents; holding event in home school; providing finger foods for students, parents, and family members; inviting career reps to school to be interviewed by students and learn about the math skills required for reps' employment; providing educational devices to students holding winning numbers (as door prizes); and using a designated parent liaison to greet parents, converse with all parents throughout the evening, answer questions, serve drinks, and thank parents for attending at end of event.

One of two approaches can be used in having students complete the "Math at Work in Our Community" that is a key activity of the community event team in collaboration with the math

teacher. The math teacher and principal at Arcadia Middle School in Accomack County chose to bring representatives of 16 different business to the community event and rotate students through the different stations, where students interviewed the business representative and completed the assignment card. This strategy accommodates a rural context where there are few businesses distributed across the area, as less travel and time is demanded of parents to take child to a business and also prevents the same person in a business from being interviewed several times by different students. All students complete their interview card during the community event. The teachers uses the completed cards to facilitate a classroom discussion about how math is used in the workplace.

In Page County, where three teachers from two high schools and a middle school served to pilot the model of shared responsibility, the students completed the "Math at Work in Our Community" activity before the community event was held. The community event team collaborated with the math teacher, who assigned the activity as homework. Students talked with parents/family members to identify person who lives in community and works in jobs that requires use of math. Students interviewed the person and completed the interview card provided by teacher. Community team retrieved the cards, analyzed results, and used the results to plan the STEM-H community event meeting for students and family members. In both approaches for conducting the "Math at Work in Our Community," the community event team provided recognition and awards (prizes) for students completing the activity, as evidenced by return of the completed interview card.

3. Lessons learned regarding issues that limited parents and family members from attending and or participating in the Family Math Night and the Community STEM-H Careers Event at **Arcadia Middle School in Accomack County pilot site** included:

- Lack of transportation.
- Conflicting work schedule.
- Inconvenient time.
- Inconvenient date.
- No child care provided for younger children.

Regardless of limitations, approximately 65 percent of parents participated in *Family Math Night*, according to the sign-in sheets. Over 90 percent of parents participated in the *Community STEM-H Career Event* held at Arcadia Middle School, according to the sign-in sheets.

4. Lessons learned regarding issues that limited parents and family members **in Page County pilot site** from attending and or participating in the Family Math Night (held at Page Co. HS) and the STEM-H Careers Community Event (held at Luray HS as part of school system's Night of Excellence annual event) included:

- Family Math Night event was not held in home school (held at Page County High for teachers in pilot sites at both high schools).
- Community STEM-H Careers Event was not held in home school (held at Luray High for both schools)
- Lack of transportation.
- Conflicting work schedules.

- Inconvenient date.
- Inconvenient time.
- Distance to travel.
- Participation in upper grades is challenging.

According to the sign-in sheets, 45 percent of parents and students attended Family Math Night. According to the sign-in sheet, a low percentage attended the *STEM-H Careers Community Event*, but a much higher percentage of parents and students attended the Night of Excellence event. The announcement of community STEM-H careers event was not received by all parents of "pilot" students.

4. What impact did the partnership with the private sector provide to your grant?

Private sector partners for the RMEP project provided critical support and resources that aided in the development of the shared responsibility model. For example, the Southern Virginia Higher Education Foundation, formerly known as the Halifax Education Foundation, provided the matching funds necessary to secure the i3 grant from USED. The provision of matching funds from an established education entity serving the Southside Virginia region, especially one with a focus on increasing post-secondary career opportunities for the region, created a strong sign of community support for the project and lent clout to the development work conducted under the project. The support of the foundation signals to the local community that investing in research and development in their schools can help create innovative solutions to education challenges.

The group of STEM-H technicians who participated in the modified DACUM sessions, and the local businesses that allowed us to work with their technicians, are also considered project partners. Their input helped teachers answer the critical question students ask about math: "Why do I need to learn math and when will I ever use it?" Their participation helped the math development team create lesson plans aligned with the Virginia state standards and infused with examples of real-world applications and project-based learning activities. These lesson plans help students understand the relevance of math skills and competencies to future job success and will be used by math teachers for years to come. Additionally, the technicians were video-recorded explaining the use of math in the high-demand STEM-H jobs available in the local rural community. This component of the project work created connections between education and local business. It also was a valuable component of the Math Advanced Study Guide used by teachers and family math nights and community STEM-H careers events held for students and their families.

MARi, LLC, volunteered as a partner in the project to customize an electronic data management platform that met teachers' needs to manage and track student completion of the online homework assignments that were a part of the project. The contribution of efforts and resources from the MARi, LLC team helped the RMEP project staff develop a technology solution to a data collection challenge that emerged during model development.

Verizon also became a partner in the RMEP project by providing a discount package for tablets and data plans for every student in the project. Having a major telecommunications company as a contributor to the project demonstrates to the local rural community the importance of business support of education initiatives. For rural schools that typically have limited fiscal and

other resources, business contributions can help provide needed materials, infrastructure, and other resources to advance education goals.

5. What impact did any other partnerships (nonprofits, schools, LEAs) provide to your grant?

Six school divisions served as partners in the development of the RMEP shared responsibility model: the counties of Charlotte, Cumberland, Halifax, Henry, and Prince Edward, and the city of Martinsville. School division interest and willingness to participate in the development of the model were critical in providing a cohort of teachers willing to take on the teacher role and fulfill the assigned functions and provide feedback and recommendations based on their experiences.

In year 5, the extension year, Accomack and Page Counties volunteered to serve as pilot demonstration sites for the final semester of the project to try implementing the revised RMEP model and related website. Feedback from educators and others in the pilot sites further enhanced revisions and development of resources that could help future sites implement the model of shared responsibility effectively.

Community organizations, local 4-H extensions for the original model development phase and other community entities for the pilot demonstration sites, served as important partners to conduct the STEM-H Community Careers Events and provide feedback and recommendations for this component of the model. The project also benefitted from use of facilities at the Southern Virginia Higher Education Center.

6. What has i3 allowed you to accomplish that you otherwise would not have been able to do?

The i3 RMEP grant afforded VASS the opportunity to bring education innovation to Southside rural Virginia through a partnership concept, specifically focused on high poverty rural school systems. This area of the state suffers from finite fiscal resources that must be concentrated on basic school operations. Opportunities to explore new research-based ideas and practices are limited. The i3 project also provided VASS with the leverage to create a network of partner school divisions, community organizations, and businesses that could use their collective resources to improve math success for students, and ultimately, increase the pool of student better prepared to enter high-demand STEM and health careers in rural Southside Virginia. The same is true for the two pilot demonstration sites which extended VASS's reach into the Shenandoah Valley and the Eastern Shore of Virginia – two rural regions of the state where education innovation can play an important part in current and future economic development.

The creation of the final revised model, designed in partnership with the participating school divisions, provides a model of shared responsibility for success in foundational math courses that could be replicated in other rural schools. The RMEP project also enabled VASS, Inc. to learn about other innovative i3 projects and network with others in the i3 rural community of practice. VASS, Inc. personnel were able to attend national meetings, make presentations, and disseminate information in peer-reviewed journals and other sources that would likely not have been possible or pursued without the i3 RMEP project. The RMEP project also helped Vass, Inc. better understand how an external evaluation can have a productive role in project management and the evolution of developing new educational materials.

7. What is the lasting legacy of i3 in the respective areas served by your grant?

The lasting legacy of the i3 grant in the areas served by the RMEP grant is the intentional focus on improving outcomes for students in rural schools and the highlighted importance of success in math as a foundation for success in local high-demand STEM and health careers, particularly technical-level occupations important to the regional economy and workforce development.

The lasting legacy is also the spotlight on the importance of shared responsibility in student success. Together, families, educators, community organizations, and other partners can harness their collective impact by fulfilling certain responsibilities that encourage and foster student success in math. Finally, the RMEP model creates at least one solution that helps address local employer needs to fill high-demand STEM and health positions with employees better prepared to apply math skills and concepts to job responsibilities.

But perhaps the most important lasting legacy is the realization by teachers of the specific math competencies used by STEM-H technicians in performing their job and willingness of technicians to provide examples for students of real-world applications. The Math Advanced Study Guide and the technicians in the region offer a valuable resource for teachers to make math instruction relevant for students. Also, an important legacy may be how a much larger proportion of the parents, family members and others in the local communities better understand the role of both math success and STEM and health careers in the future success of both students and communities.

Other Comments, Stories and Supporting Materials (websites, video links, brochures, etc.) that complement your narrative, please share that with us as well.

Stories

Teachers found great value in participating in the DACUM sessions. As they listened to the technicians describe their job duties, they were able to connect the concepts they teach in the classroom to an occupation. This would help students find relevance in math. One teacher even commented that she would be teaching differently after attending the session.

In cases where students do not have technology and/or internet access, it may be a good idea to make the assignment a week before it is due. If there is a one-to-one initiative for students, they may be able to access the internet at a friend or family member's house, the public library, a local restaurant that offers free Wi-Fi (such as McDonald's, Chic-Fil-A, etc.). For students who do not have a one-to-one initiative, they may have the opportunity to complete the assignment at a place in which there is technology and/or internet availability such as friend or family member's house, the public library, etc. As a last resort, students may use devices and/or internet at school to complete the assignments. Since the goal is to have parents reinforce student completion of online homework in the home environment, this would not be the ideal situation.

Resources

Following is a list of supporting materials for the RMEP project that could be valuable for school systems, rural communities, as well as other persons or organizations interested in advancing

the model of shared responsibility developed with the USED i3 grant funds and private sector matching funds. Other materials below include some of the resources developed during original project implementation.

http://www.vaadvstudies.org/rmep: Provides additional RMEP background information and an informational video about the final revised model.

http://www.vaadvstudies.org/rmep-resources: Provides copies of RMEP newsletters for each project year and copies of the final RMEP evaluation report.

www.ruralmath.com: Provides overview information about the project and a link to a video with an overview of the project. On this page is access to three password-protected portals for each of the role groups in the model: Teachers; Parents & Family; and Community.

http://ruralmath.com/about: Provides general RMEP history and a brief overview of the model.

http://ruralmath.com/current-sites: Provides descriptions of the two pilot demonstration sites – Accomack and Page Counties.

http://ruralmath.com/occupational-profiles: Contains occupational profiles and data for seven STEM-H job areas in the regions served by the RMEP project – Southside Virginia and Accomack and Page Counties.

http://ruralmath.com/community-demographic-profiles: Contains community demographic profiles for the regions served by the RMEP project – Southside Virginia and Accomack and Page Counties.

http://ruralmath.com/principal-videos: Contains 10 short video episodes designed and curated to give RMEP principals strategies for supporting innovative teachers.

http://ruralmath.com/teachers: Portal for teachers implementing RMEP. Resources include a welcome video and document; the Math Advanced Study Guide; a series of family engagement videos; and a series of videos of STEM-H technicians sharing how they use math in the workplace and examples of tools they use to conduct their daily duties.

http://ruralmath.com/parents-family: Portal for family members providing support to RMEP students. Resources include a welcome video and document; a series of family engagement videos; a series of videos of STEM-H technicians sharing how they use math in the workplace and examples of tools they use to conduct their daily duties; and online resources for exploring available STEM and health jobs and the training/certifications required to pursue them.

http://ruralmath.com/community: Portal for community organization members implementing RMEP. Resources include a welcome video and document; a community team orientation PowerPoint; a frequently asked question and answer document; and a description of the “Math at Work in our Community” activity.

https://vimeo.com/249817147/70ae16dc6c: Video highlighting the revised RMEP model; pilot site implementation of the model; and the online resources.

https://i3community.ed.gov/impact-stories/1989: Links to a blog by RMEP project manager, Jennifer Stevens, about the successes and challenges of technology in this rural project.

https://www.rmepva.com/: Link to first RMEP website which teachers in the original 6 partner LEAs used for project information and resource sharing.

Next Steps

Sustaining Progress

Important sustainability actions were taken during the last two years of the RMEP project to improve sustainability of the model of shared responsibility that could lead to further development, adoption or adaptation in rural school districts. First, the project's math specialist identified a small cadre of teachers from implementation sites that could assist in offering a workshop for teachers entitled "Supporting Student Success in Math for College and Careers." The workshops were offered for math teachers in four rural locations in Virginia: Boydton, Abingdon, Rocky Mount, and Galax. These sessions afforded teachers opportunities to become advocates, resource persons and possible trainers for the model. The sessions also exposed the model to an audience of teachers and LEAs who had not been involved in the development work. Therefore, the workshop sessions intended to increase interests in the model for possible adoption or adaptation and increase VASS, Inc. capacity of trainers to expand the model, or key elements, to new school divisions in Virginia.

External evaluation results, however, revealed that positive results were evolving but modifications in the model and or supports were necessary to increase success of key components, like parent/family participation in family math nights. Therefore, major technology enhancements were pursued to provide online options for most activities in the model. A revised web site and numerous videos were developed as key supports. This new option was tried during the project's extension year on a small scale (i.e., one semester) in two additional rural LEAs identified as pilot demonstration sites. Results suggest the model and supports, with minor additional development work, should be subjected to efficacy trials as a next step. This step is necessary to verify if the innovative promising practice can achieve intended results. VASS, Inc. is now advancing knowledge of the RMEP project in multiple ways to increase model visibility as a strategy to attract possible partners and funders for further model refinement and efficacy trials in other states.

During the five years, VASS, Inc. laid the foundation about the project by making key presentations at national meetings, such as the National Council of Teachers of Mathematics (NCTM) and the National Rural Education Association (NREA). Networking opportunities and staff leadership roles in the i3 community of practice (CoP) helped increase awareness of the model. In addition, VASS, Inc. won a second i3 development grant to develop the Rural Math Innovation Network. Started January 2017, the new project also can serve as a vehicle to advance knowledge about the RMEP model of shared responsibility or key components (e.g., value of using STEM-H technicians to create instructional lessons with math applications to the workplace).

Further Scaling of i3 Work

Scaling of the model is appropriate after efficacy trials reveal the model can achieve its desired results. Therefore, further testing of the model is essential across a diversity of rural school settings to answer the question of how the model works for whom and under what conditions. However, it is apparent that certain components of the model hold promise for scaling that could impact teacher success in motivating students to connect applications of math knowledge and skills to workforce development in rural areas. Teachers in the RMEP project broadly acknowledged, for example, their high interest in working with STEM-H technicians to make lessons more relevant for students. Community STEM-H career events have potential to impact student, parent and community attitudes regarding the need for mastery of certain math skills as preparation for a postsecondary credential (e.g., certificate or Associate degree) required in the workplace for evolving technician occupations.

Key technology supports (e.g., videos) on the revised web site offer easy access to valuable resources for parents/families. VASS, Inc. intends to explore these and other results of the RMEP project as scalable "products." It is anticipated numerous RMEP products could become key resources for school improvement plans in high poverty rural school environments across the nation.

Disseminating Results

During the project RMEP staff made numerous efforts to disseminate project work. One continuous effort was publication of an annual RMEP newsletter, with the last issue including external evaluation results and lessons learned (see December 2016 RMEP newsletter available at http://www.vaadvstudies.org/rmep). Examples of RMEP staff presentations include:

- Presented session titled "Sharing the Responsibility for Student Success in Math and Future Careers" at the Southwest VA STEM SUMMIT held at Virginia Tech University.
- Presented a roundtable session at the Virginia School Board Association (VSBA) annual event in Richmond, VA.
- Described "Math at Work in Our Community" activity at the Virginia Department of Education's Twelfth Annual Rural and Low-Income School Program Symposium held in Charlottesville, Virginia. Title of the presentation was "Using a Student Activity to Increase Family and Community Engagement in Rural Schools."
- Presented at National Council of Teachers of Mathematics (NCTM) session titled "Bringing the Workplace into the Math Classroom."
- Presented "Taking 'Rural' Advantage of Opportunities in the Every Student Succeeds Act (ESSA)" at the Virginia Association of Federal Education Program Administrators (VAFEPA) annual conference in Richmond, Virginia and at the 108th National Rural Education Association's Annual Conference and Research Symposium and Battelle for Kids National Rural Forum held at The Ohio State University.
- Disseminated information about RMEP project on *The Farm Journal's AgriTalk*, a live, nationally syndicated talk radio program for agriculture and rural America.
- Posted on project web site video of the executive director of the National Rural Education Association (NREA) explaining why innovations like RMEP are critical for students, schools and communities in rural America.

One article about the project was published in a peer-reviewed journal, *The Rural Educator* (Fall 2016 issue), titled "The Math Learning Gap: Preparing STEM Technicians for the New Rural Economy." A second article, titled "Rural Resources" and published in the March/April 2018 issue of *Principal* magazine, highlights the RMEP project model and support resources. In addition, RMEP was highlighted as project leadership took advantage of an invited opportunity to conduct workshop sessions for more than 320 participants at the Alberta Rural Education Symposium in Edmonton, Alberta Canada. VASS, Inc. continues to disseminate results of the RMEP project on its web site. Additional articles are under development to increase exposure of the model or key components to researchers and practitioners.

The project's external evaluation report is available on the VASS, Inc. web site and in the ERIC data base. The project's final performance report will be submitted to the ERIC data base. A "Products of the Rural Math Excel Partnership Project" document will be submitted for posting to the i3/EIR community of practice web site. VASS, Inc. also plans to partner with the National Rural Education Association to make these products known by all state-affiliate associations. VASS, Inc. is also exploring how the RMEP model of shared responsibility and products can be shared in an *Education Week* article.